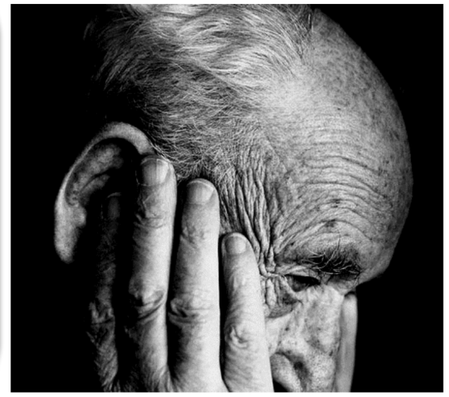
Draw Pharmacology in your mind



Alzheimer's disease

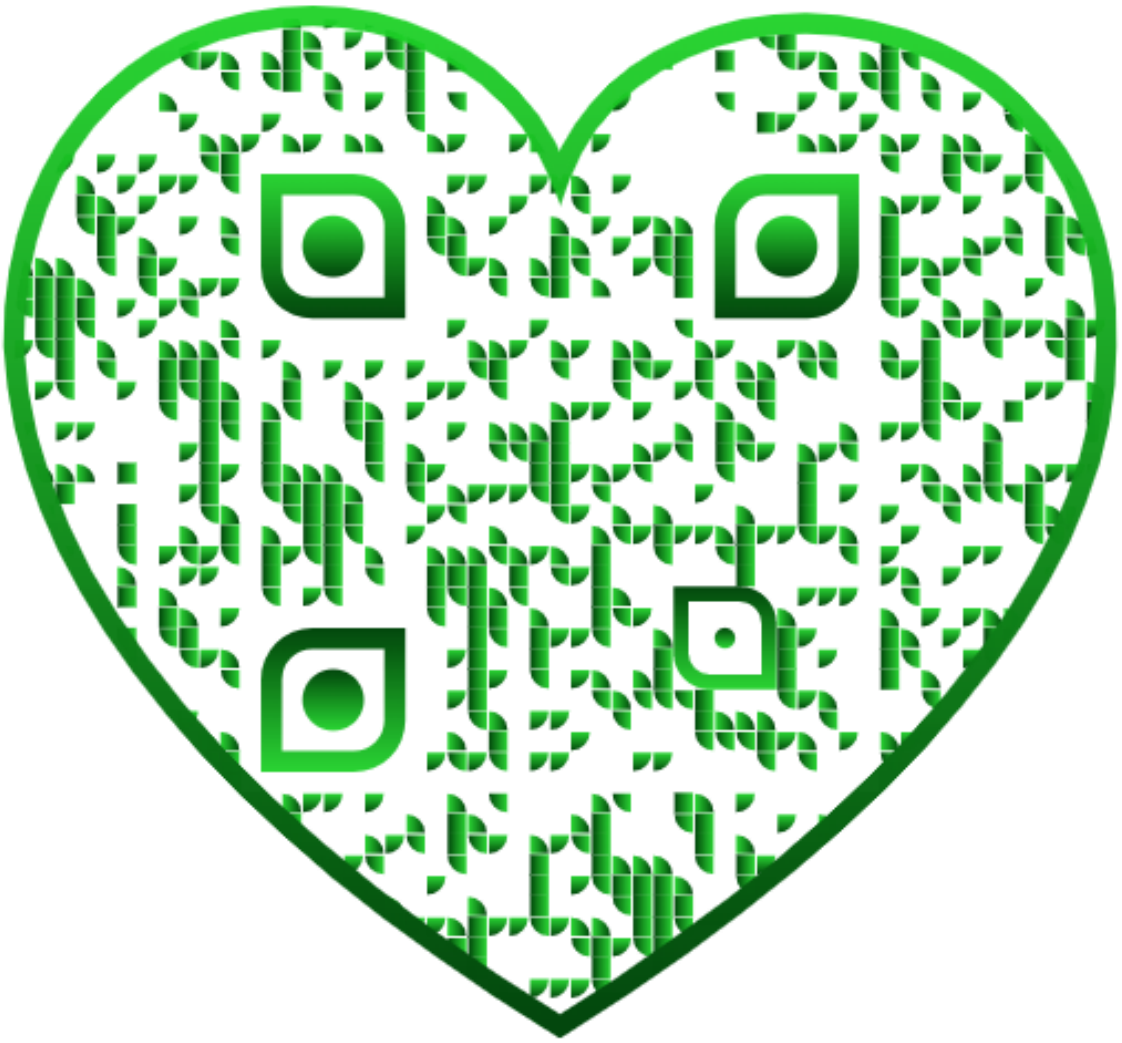
If you are a pharmacy student
If you are postgraduate and want to revise pharmacology by an easy way
If you are using any pharmacology reference
this file will aid you
> And wait for more <

Follow me at
Pharmacistalaanasr.wordpress.com
Contact me at
Pharm.alaa@gmail.com

لا تنسونى من صالح دعائكم

Pharmacist. Alaa Nasr

د. آلاء نصر



Alzheimer's disease

- **It is an irreversible neurodegenerative disorder** *that was first described by* → german psychiatrist and neuropathologist Alois Alzheimer in 1906
- **Neurons** in the brain regions involved in **learning and memory processes** are affected by **degeneration** → **stop functioning** → so, this disease causes problems with **memory, thinking and behavior** → and it is the most common cause for **dementia** العته/النسيان → **and it gets worse by time**

- **Notice that..** It is **NOT** a normal part of aging *(many old people have a strong memory and mental activity)*

Symptoms

1. Forgetfulness النسيان *(ex. to do something and then forgets that he has done it)*
2. Confusion تشوش ذهنى *(ex.talks → stops talking → and forgets what he was talking about)*
3. Memory loss *(short-term memory "Hippocampus" is affected first then long-term memory)*
4. Getting lost in familiar places *(ex. getting lost in the place he used to work in for years!)*
5. Troubles with language *(ex. he forgets words)*
6. Difficulty in performing familiar tasks *(ex. can not do what he used to do)*
7. Disorientation of time and place *(ex. thinks that for example 2pm is 7pm and so on, do not know where he is)*
8. Changing in personality *(behaviors)*
9. Problems with thinking

Notice that.. *while the disease* ***progresses*** *→ the degeneration spreads to other regions in the brain till it reaches the respiratory center → respiratory failure → causing* ***death***

Types

Late onset form

- **Most common form**
- **Onset:** After age **60**
- **Progression:** over 5-15 years

Early onset form

- **Onset:** age **40-50**
- **Progression:** rapidly leading to death within 2-3 years

Alzheimer's disease Vs Aging

Alzheimer's disease	Aging
1. Forgets the whole experience *(ex. driving)*	1. Could forget a part of an experience
2. Rarely remembers later	2. Often remembers later
3. Gradually unable to follow written or spoken directions	3. Usually able to follow written or spoken directions
4. Gradually unable to care for himself	4. Usually able to care for himself

Ph. Alaa Nasr

Pathophysiology

Alzheimer's disease is characterized by the development of

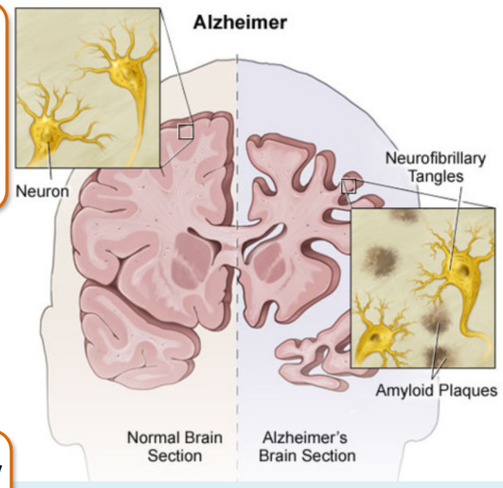
1. Amyloid deposites (Senile plaques)

Abnormal **clusters** of **protein fragments** called **"β-amyloid"** that build up in spaces between nerve cells

2. Neurofibrillary tangles

Abnormal **Intracellular accumulations** of **twisted fibrillary deposites** of the microtubule associated with protein that build up inside neurons

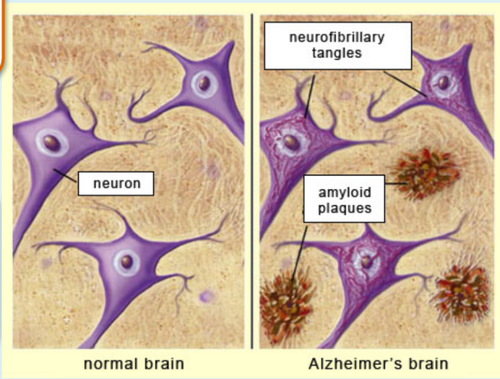
Note that.. Amyloid precursor protein → transmembrane protein that may normally function in the regulation of synaptic plasticity and cell survival



Parts affected in the brain

Hippocampus *(short-term memory)* and **Cortex**

Degeneration affects **cholinergic neurons** → ⇓ ***Ach level in Hippocampus and Cortex***



Risk factors

1. Age
2. Family history
3. High blood pressure
4. Head trauma
5. Women > Men

Pharmacological treatment

As Alzheimer's disease is caused by an irreversible damage of neurons so there is no treatment can completely cure or protect the neurons, it is only **symptomatic treatment**

1. Acetylcholinesterase inhibitors

- **Tacrine**
- **Donepezil**
- **Rivastigmine**
- **Galantamine**

They inhibit acetylcholinesterase enzyme which break down Ach → ⇑ **Ach** level in the brain

2. NMDA antagonists

- **Memantine**

Non-competitive NMDA receptor antagonist

Remember.. Glutamate *(the substrate on NMDA receptor)* → is a useful excitatory neurotransmitter in CNS but its excessive amount in CNS could lead to → **"Excitotoxicity"** (cell death) **that may be involved in**:
Alzheimer's disease, Parkinson's disease, Multiple sclerosis

3. Supportive treatment

Vitamine E (Tocopherol) → an antioxidant → protecting against plaque formation in the brain